# MEMORANDUM

To: NPDES Permittee

From: Industrial, Agricultural and Storm Water Permitting Division
Water Facilities Permitting Division

Date: August 25, 2000

RE: NPDES Application Supplement
Mixing Zone Request Form

The Department has determined that your facility may be subject to whole effluent toxicity (WET) testing monitoring and/or limitations based on the nature of your discharge(s). In order to get the appropriate information needed to determine permit requirements, the attached documents have been developed to assist you in submitting this information.

As explained on the attached Mixing Zone Request Form, there are different permitting scenarios. In order for us to determine mixing zone size and WET requirements for your discharge(s), please complete the attached form. Please submit the form with an attached cover letter, required supplemental information and a report, if necessary, describing the work performed and any other pertinent information relative to the discharge(s) that might influence WET requirements. Instream assessments that have already been performed may be valuable additional information.

If you choose to perform a mixing zone demonstration, the Department recommends a proposed demonstration plan be submitted for review and approval prior to any work being performed. The proposal must address the factors outlined in the Mixing Zone Request Form. Depending on the time needed to complete a demonstration, a schedule of compliance with a final chronic WET limit at 100% may be placed in the permit to allow time for the demonstration to be performed and the results submitted. Upon approval of the demonstration, a permit modification will be necessary to place different WET requirements in the permit based on the results of the demonstration.

In addition to the above, please indicate whether a pass/fail (single dilution) or multi-concentration test is preferred. The pass/fail, or single dilution, test, provides for a confidence level of 99% on a chronic test for determining whether a test statistically passes or fails. The data from a pass/fail test may not, in some situations, be useful in determining whether reasonable potential for WET exists. The multi-concentration test, however, provides more information on toxicity over a range of concentrations and may give enough information to show that reasonable potential does not exist. The limitations for a multi-concentration test are expressed as a percent effect and allow for averaging of test results. A pass/fail test has a maximum pass or fail limit and does not allow for averaging of results to demonstrate compliance.

Should you have any questions or comments, please contact your permit writer or this office at 803-898-4300.

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

**NPDES APPLICATION SUPPLEMENT**

# *Mixing Zone Request Form for Surface Water Discharges*

**NPDES #:** _____

**Facility Name:** _____

**County:** _____

**Are you requesting a mixing zone for whole effluent toxicity (WET) in accordance with the back of this form?**

G **No**. No further information is needed. Submit this form. If WET testing is required, a chronic test at 100% will be required.

G **Yes**. Check one of the boxes below and submit this form with the appropriate information.

G Check this block if you are proposing to perform or have performed a mixing zone demonstration to determine the appropriate zone of initial dilution (ZID) and/or mixing zone size. Complete the remainder of this form and submit a mixing zone demonstration plan as described on the back of this form. The Department recommends the demonstration plan be approved prior to implementation of any demonstration work.

G Check this block if you are requesting a mixing zone by providing limited information such as a mixing model like CORMIX to determine mixing in accordance with suggested zone of initial dilution (ZID)and/or mixing zone sizes. Complete the remainder of this form, as applicable, and submit the CORMIX Supplement and modeling results (or other model assumptions, inputs and results).

**What is the proposed ZID size (in meters)?** Length: _____m Width:_____m

**What is the proposed acute WET test concentration?** _____%

**What is the proposed mixing zone size (in meters)?** Length: _____m Width:____m

**What is the proposed chronic WET test concentration?** _____%

**Printed Name:** _____ **Firm:** _____

**Signature:** _____ **Date:** _____

# Whole Effluent Toxicity
## Mixing Zone Strategy

**In the absence of information regarding the mixing characteristics of a discharge, a mixing zone is not allowed. In these situations, a chronic whole effluent toxicity (WET) test shall be required at a test concentration of 100% when WET requirements are needed per R.61-9. If you believe a mixing zone is justified which would result in a WET test concentration other than 100% chronic for your new or reissued permit, a mixing zone satisfying the provisions of R.61-68 must be requested.**

A comprehensive mixing zone demonstration may be performed to show an acceptable mixing zone size. The demonstration must indicate the dimensions of the mixing zone (in terms of stream width and downstream distances), how the size of the mixing zone is minimized and the proposed test concentrations for acute and chronic whole effluent toxicity. The demonstration must also show the following:

1. There is no acutely toxic impact (except within a Zone of Initial Dilution (ZID)).
2. The mixing zone will not adversely affect safe passage of aquatic organisms.
3. The mixing zone provides adequate protection of existing and designated uses of the waterbody.
4. The mixing zone will not produce undesirable organisms or result in dominance of nuisance species outside the mixing zone.
5. The mixing zone will not endanger public health or welfare.

A mixing zone demonstration may include, but not be limited to, discharge modeling information, dye studies, conductivity studies, instream biological survey data, chemical, physical, engineering and hydrological information relative to the discharge and stream characteristics. The mixing zone size shall be based on critical flow conditions. Data not collected at or that is not representative of critical flow conditions may not be considered appropriate in determining mixing. A plan for a mixing zone demonstration should be submitted to the Department for approval prior to conducting the work so that we can insure that the appropriate conditions are being used in the demonstration.

A mixing zone, under certain appropriate circumstances, may be allowed by the Department with a limited mixing zone demonstration. In some cases, a mixing model, such as CORMIX, may be used to show appropriate mixing within boundaries acceptable to the Department. Suggested chronic mixing zone boundaries are 1/3 of the stream width in width and two times the stream width in length. The chronic WET test concentration (CTC) is determined using the model and the most restrictive chronic boundary. The acute mixing zone, or Zone of Initial Dilution (ZID), size suggested is 1/10 of the stream width in width and 1/3 of the stream width in length. The acute WET test concentration (ATC) is determined using the model and the most restrictive ZID boundary. A more limited mixing zone size or no mixing zone may be appropriate under limited mixing conditions or as demonstrated by the model. The CORMIX Supplement describes the information required to run the CORMIX model. CORMIX V.3.2 may be downloaded from the Internet at *http://steens.ese.ogi.edu*.

# Mixing Zone Request Form
# for
# Surface Water Discharges

**1. Purpose:**

This supplement will be completed as part of the NPDES permitting application. It will be provided to the Department for any new or reissuance NPDES permit application. This supplement is to provide a written statement on NPDES permit applicants request for a mixing zone as may be allowed.

**2. General:**

Mixing zone demonstration information will be submitted along with this form.

**3. Item by Item Instructions:**

| | |
|---|---|
| *NPDES # :* | Enter the NPDES permit of the facility. If this is a new discharge, enter "new discharge." |
| *Facility Name:* | Enter the name of the facility. |
| *County:* | Enter the county of the facility. |
| *Questions:* | Answer the questions and provide the appropriate information for a mixing zone demonstration, if applicable. |
| *Printed Name:* | Print name of individual signing the form. |
| *Firm:* | Enter the name of the company or engineering firm that the individual signing this form is employed by. |
| *Signature:* | Signature of responsible official. |
| *Date*: | Enter date form was signed. |

**4. Office Mechanics:**

Copies of this supplement along with the required information on a mixing zone demonstration are provided to the Department with an NPDES permit application. This supplement is filed in the NPDES permit file.